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From the INTERNATIONAL BUREAU

NOTIFICATION CONCERNING
TRANSMITTAL OF COPY OF INTERNATIONAL
PRELIMINARY REPORT ON PATENTABILITY
(CHAPTER I OF THE PATENT COOPERATION
TREATY)

(PCT Rule 44bis.1(c))

To:

ROSENBERG, Frank
Frank Rosenberg
Po Box 29230
San Francisco, CA 94129-0230
ETATS-UNIS D'AMERIQUE

Date of mailing (day/month/year)

07 October 2010 (07.10.2010)

Applicant's or agent's file reference

15251PCT

IMPORTANT NOTICE

International application No.

PCT/US2009/038472

International filing date (day/month/year)

26 March 2009 (26.03.2009)

Priority date (day/month/year)

26 March 2008 (26.03.2008)

Applicant

BATTELLE MEMORIAL INSTITUTE et al

The International Bureau transmits herewith a copy of the international preliminary report on patentability (Chapter I of the Patent Cooperation Treaty)

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Authorized officer

Simin Baharlou

Facsimile No. +41 22 338 82 70

e-mail: pt09.pct@wipo.int

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44*bis*)

| | | |
|--|---|---|
| Applicant's or agent's file reference 15251PCT | FOR FURTHER ACTION | See item 4 below |
| International application No. PCT/US2009/038472 | International filing date (<i>day/month/year</i>) 26 March 2009 (26.03.2009) | Priority date (<i>day/month/year</i>) 26 March 2008 (26.03.2008) |
| International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237 | | |
| Applicant BATTELLE MEMORIAL INSTITUTE | | |

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 *bis*.1(a).

2. This REPORT consists of a total of 8 sheets, including this cover sheet.

In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

- | | | |
|-------------------------------------|--------------|---|
| <input checked="" type="checkbox"/> | Box No. I | Basis of the report |
| <input type="checkbox"/> | Box No. II | Priority |
| <input type="checkbox"/> | Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability |
| <input type="checkbox"/> | Box No. IV | Lack of unity of invention |
| <input checked="" type="checkbox"/> | Box No. V | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/> | Box No. VI | Certain documents cited |
| <input type="checkbox"/> | Box No. VII | Certain defects in the international application |
| <input checked="" type="checkbox"/> | Box No. VIII | Certain observations on the international application |

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44*bis*.3(c) and 93*bis*.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44*bis*.2).

| | |
|---|--|
| The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland | Date of issuance of this report 28 September 2010 (28.09.2010) |
| Facsimile No. +41 22 338 82 70 | Authorized officer <div style="text-align: center; font-weight: bold; margin-top: 10px;">Simin Baharlou</div> e-mail: pt09.pct@wipo.int |

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

To:

see form PCT/ISA/220

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/US2009/038472

International filing date (day/month/year)
26.03.2009

Priority date (day/month/year)
26.03.2008

International Patent Classification (IPC) or both national classification and IPC
INV. A61M16/10 C01B13/02

Applicant
BATTELLE MEMORIAL INSTITUTE

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



European Patent Office
P.B. 5818 Patentlaan 2
NL-2280 HV Rijswijk - Pays Bas
Tel. +31 70 340 - 2040
Fax: +31 70 340 - 3016

Date of completion of
this opinion

see form
PCT/ISA/210

Authorized Officer

Galleiske, Anke

Telephone No. +31 70 340-8485



**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US2009/038472

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:
 - ☒ the international application in the language in which it was filed
 - ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).
2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a))
3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ on paper
 - ☐ in electronic form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in electronic form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
4. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US2009/038472

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | |
|-------------------------------|-------------|-----------------------|
| Novelty (N) | Yes: Claims | <u>4-14, 19</u> |
| | No: Claims | <u>1-3, 15-18, 20</u> |
| Inventive step (IS) | Yes: Claims | <u>4-14</u> |
| | No: Claims | <u>1-3, 15-20</u> |
| Industrial applicability (IA) | Yes: Claims | <u>1-20</u> |
| | No: Claims | |

2. Citations and explanations

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item V.

Reference is made to the following document:

- D1 WO01/82896 A1 (BIOLIFE [US], 8 November 2001)
- D2 GB553004 (HERZMARK N, 4 May 1943)
- D3 US2005/0022810 (MOORE B K ET AL. [US], 3 February 2005), cited by the appl.
- D4 Delaude L et al., *A Novel Oxidizing Reagent Based on Potassium Ferrate(VI)*, Journal of Organic Chemistry, 61, 1996, 6360-6370.
- D5 US6267896 B1 (PATTERSON ET AL., 31 July 2001)

1. Claims 1-3 and 13-19 contain subject-matter considered to be a method for treatment of the human or animal body by therapy, covered by the provisions of Rule 39.1 (iv). Therapy implies the curing of a malfunctioning of the body. From the wording of the claims ("supplying oxygen to a human or nonhuman animal" (claim 1), "emergency oxygen" (claim 2), "supplying oxygen comprising providing apparatus comprising (...) respiratory apparatus, a face mask or oral insert or nasal insert" (claim 13)) it derives that the subject-matter of the claims is directed towards methods of supplying oxygen in therapeutical treatments.
Subject-matter covered by the provisions of Rule 39.1 (iv) is not to be searched according to Article 17 (2)(a)(i).
Claims 1-3 and 13-19 were therefore searched and examined as if directed towards a method of generating oxygen.
2. The subject-matter of claims 1-3 and 20 is unclear as explicitly discussed under item VIII. Due to the clarity problems and the objections raised under point 1., claims 1-3 were currently understood to contain the following technical features:
A method of generating oxygen comprising generating oxygen by combining ferrate (VI) with water in the presence of an acid.
Claim 20 was understood to contain the following technical features:
A ferrate (VI)-containing composition comprising a ferrate (VI)-containing solid and a solid acid.

The present application does not meet the criteria of Article 33(1) PCT, because

the subject-matter of claims 1-3, 13, 15-18 and 20 is not new in the sense of Article 33(2) PCT.

2.1 Document D1 discloses:

A method comprising generating oxygen (page 10, line 14; page 12, line 13) by combining ferrate(VI) with water (page 10, line 14; page 12, line 13) in the presence of an acid (page 18, line 28) and thereby generating a stream of gaseous oxygen (page 10, line 14; page 12, line 13).

Further disclosed are a method comprising combining ferrate and the acid form of low cross-linked ion exchange resin particles (page 15, lines 26-29) in an aqueous media (page 16, line 4 and lines 11-14), thereby generating oxygen. The mixture is spread on a wound (page 16, line 5-6).

Further disclosed is a composition comprising a ferrate(VI) and a solid acid (claim 12), specified solid acids are acidic inorganic salts (e.g. NaHSO_4) or organic acids (e.g. citric acid, carboxylic acids) (page 18, lines 4-6).

Therefore the subject-matter of claims 1-3, 15-18 and 20 is not novel.

2.2 The subject-matter of claim 1 is also not novel over D2, which discloses a method of supplying oxygen comprising generating oxygen by combining a mixture comprising ferrate with carbon dioxide as a weak acid and moisture (page 3, lines 57 to 107).

2.3 Document D3 discloses:

A method of supplying oxygen (paragraph [0011]) comprising providing apparatus (fig. 4, reference 100) comprising a mixing compartment (fig. 4, reference 112) and respiratory apparatus/face mask (fig. 4, references 150 and 168), and the method further comprising generating oxygen in the mixing compartment [paragraph [0050]] and passing it through the mask (paragraph [0050]).

Therefore the subject-matter of claim 13 is not novel.

3. Dependent claim 19 does not contain any features which, in combination with the features of any claim to which it refers, meet the requirements of the PCT in respect of inventive step.

4. Document D3 is regarded as being the closest prior art to the subject-matter of claim 4 and discloses:

An oxygen dispenser (fig. 4, reference 100) comprising a first compartment (fig. 2, reference 112) comprising a first reaction material (fig. 4, reference 114) and a second compartment (fig. 4, reference 116) comprising a second reaction material (fig. 4, reference 118) and a respiratory apparatus (fig. 4, reference 168).

Oxygen is generated when first and second material are mixed (claim 1).

The respiratory apparatus comprises a mask to be worn on the face (fig. 4, reference 168) or a nasal mask (paragraph [0016]).

The first and second compartment are separated by a separation membrane rupturing on pressure (paragraph [0014], feature corresponds to breakable wall).

The subject-matter of claim 4 therefore differs from this known apparatus in that the material in the first compartment is specified as comprising ferrate and in that the material in the second compartment is specified as comprising acid.

The subject-matter of claim 4 is therefore new (Article 33(2) PCT).

There is no evident technical effect resulting from that difference.

The problem to be solved by the present invention may therefore be regarded as the choice of appropriate materials that generate oxygen when mixed.

The solution to this problem proposed in claim 4 of the present application is considered as involving an inventive step (Article 33(3) PCT).

Ferrate has not been disclosed in the prior art as being suitable for use respiratory apparatuses. Even though Ferrate is described in document D4 as being quickly reduced in acidic solution whereby oxygen evolves, there is no indication to include it in an apparatus as disclosed in D3.

Claims 5-12 and 14 are dependent on claim 4 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

Re Item VIII.

The application does not meet the requirements of Article 6 PCT, because claims 1-4, 8, 9, 12, 19 and 20 are not clear.

1. Although claims 1, 2 and 13 have been drafted as separate independent claims, they appear to relate effectively to the same subject-matter and to differ from each other only in respect of the terminology used for the features of that subject-matter. The aforementioned claims therefore lack conciseness and as such do not meet the requirements of Article 6 PCT.
2. Claims 1-3, 8, 9 and 20 do not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not clearly defined (PCT/GL/ISPE/1 5.35). The claims attempt to define the subject-matter in terms of the result to be achieved, namely a certain amount of oxygen to be generated, which merely amounts to a statement of the underlying problem, without providing the technical features necessary for achieving this result.
3. Claims 4 and 20 are drafted as separate independent claims in the same category and therefore are not concise contrary to the requirements of Art. 6 PCT. The technical feature that the acid is solid is presented as essential in independent claim 20. Since it is not included in claim 4, claim 4 does not meet the requirements of Art. 6 PCT in that it lacks an essential feature necessary for the definition of the invention.
Present claims 4 and 20 do also not appear to comply with the requirements of unity (Rule 13 PCT).
4. Concerning claim 8 it is not clear to what exactly the "excess of acid" relates.
5. The term "polymeric acid" employed in claims 12 and 19 is not generally accepted in the art, contrary to the requirements of Rule 10.1(e) PCT.
6. The parameter reactivity as described in claim 20 is not clear, since parameters other than the molar ratio of water to ferrate (VI) influencing the pH of the aqueous composition, such as for example temperature, are not given.